SECTION 11310

SUBMERSIBLE SEWAGE PUMPS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Submersible pump equipment for sanitary sewer lift stations.

1.2 SUBMITTALS

A. Submit the following in accordance with the requirements of Section 01300:

1. Catalog data

2. Pump curves

3. Operation and maintenance data

4. Warranties

1.3 WARRANTY

A. Manufacturer's printed warranties shall apply to pumps.

B. Provide five years or 10,000 hours warranty after installation, including parts and labor.

C. Provide for repairs to be performed at the manufacturer's authorized warranty repair station located within a 200 mile radius of this Project.

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURE

A. Flygt - No substitutions.

2.2 PERFORMANCE AND DESIGN REQUIREMENTS

A. See Schedule in Part 3.

2.3 PUMP MATERIALS

A. Volute, impeller, motor housing, discharge elbow, and other components: Gray cast iron, ANSI Class 30.

B. Shaft: Stainless steel or carbon steel.

C. Motor:

1. Rotor bars and short circuit rings: Aluminum.

2. Windings: Copper

3. Stator winding and lead insulation: NEMA Class F.

D. Mechanical Seals:

1. Lower: Tungsten carbide/tungsten carbide.

2. Upper: Tungsten carbide/carbon.

E. Wear Ring:

1. Case wear ring: Steel with molded nitrile rubber.

2. Impeller wear ring: ANSI 304 stainless steel. Provide on pump greater than 15 HP.

F. Exposed Nuts and Bolts: ANSI 304 stainless steel.

2.4 PUMP CONSTRUCTION

A. Water tight sealings: Nitrile rubber O-rings against machined surfaces.

B. Cable entry design:

1. Seal: Torque-free mechanical compression type with strain relief. Do not use epoxies, silicones, or other secondary sealing. Submersible cable entry shall be field replaceable without replacing cable.

2. Seal junction chamber from motor by terminal board and an elastomer compression seal.

C. Pump Motor

1. Squirrel cage induction type, housed in air-filled water tight chamber.

2. Dip and bake stator three times in NEMA Class F varnish and heat shrink fit into the stator housing. Do not use designs requiring penetration of stator housing.

3. Motor cooling system:

a. Thermal radiators integrally cast into stator housing; up to 10.5 HP.

b. Circulation of pumped media through a cooling jacket; for 15 HP and larger.

D. Pump shaft bearings:

1. Permanently lubricated ball bearings.

a. Upper bearing: Single row deep groove.

b. Lower bearing: Two-row angular contact.

2. Sealed completely from pump liquid.

E. Minimum B10 bearing life: 20,000 hours at any point on head-capacity curve.

F. Mechanical seals: Tandem independent and run in a standard motor oil reservoir.

G. Impeller: Dynamically balanced, double shrouded, non-clog, single vane capable of handling 3 inch diameter solids, unless otherwise scheduled.

H. Equip each pump with stainless steel lifting chain and submersible pump cable.

I. Provide sliding guide bar bracket unit to guide on at least two rails which is an integral part of pump unit. Do not permit any portion of the pump or guidance system to bear on sump floor. Do not use guide cables.

J. Provide metal to metal discharge pump/elbow connection seal. Do not use diaphragm or o-ring type seals.

2.5 PERFORMANCE

A. Pump motor:

1. Non-overloading throughout pump curve.

2. Capable of 15 evenly spaced starts per hour.

3. Capable of running dry indefinitely without damage.

2.6 PROTECTIVE COATING

A. Pump exterior: PVC epoxy primer and chloric rubber paint finish.

B. Impeller: PVC epoxy or rislan.

2.7 ACCESSORIES

A. Pump accessories supplied by pump manufacturer.

B. Provide pump accessories required for proper installation and/or as recommended by manufacturer, including the following.

1. Upper and intermediate guide bar brackets.

2. Stainless steel guide rails and brackets.

3. Stainless steel lift chain.

4. Safety chain hook.

5. Cable holder for pump cable and float cables.

6. Cable support grip.

7. Anchorage.

8. Cable racks for floats.

9. Self-weighted float switches (5 ea.), Flygt, Model ENH-10.

10. Check valve, flanged ends, line size, Flygt Model HDL 5087.

11. Plug valve, eccentric, flanged ends, line size, BUNA packing, neoprene plug facings, lever handle, DeZuric series 100, Fig. No. 118.

12. Standard discharge connection.

13. Aluminum access frame and cover (double door, minimum size 48 inch x 36 inch) with stainless steel hinges and accessories, and locking mechanism for pump pit and valve pit.

2.8 PUMP CONTROLS

A. Duplex pump control panel supplied by pump supplier.

1. Manufacturer: E.G. Pumps Controls, QF Float Series.

B. Provide duplex pump controls required for proper installation and/or as recommended by manufacturer, including the following:

1. 120V for controls, 24 volts for level sensors in wet well.

2. Two pump circuit breakers: UL interrupting rating not less than 14,000 amperes RMS symmetrical at 480 volts or 22,000 amperes RMS symmetrical at 240 volts.

3. Two NEMA rated, full voltage non-reversing motor starters.

4. Duplex Logic Chassis (an anodized aluminum sub-assembly) with Logic Panel including:

a. Two Hand-Off-Auto selector switches.

b. Two run pilot lights.

c. 24V Power On pilot light.

d. Level alarm pilot light.

e. Alarm silence pushbutton.

f. Duplex alternator.

g. Lead Pump selector switch (1,2 - Alt - 2,1).

h. Normally closed, motor over-temperature contact connection for each pump motor.

I. LED status indication pilot lights for each relay function.

j. GFCI duplex convenience receptacle. Mount on left side of logic chassis.

k. GFCI simplex convenience receptacle. Mount on front of logic chassis.

5. Space heater to prevent condensation within the enclosure.

6. Ground lugs for pump and service connections.

7. Enclosure NEMA 3R.

8. Additional control breaker - 15 amp, 1 pole.

9. Control power transformer - 2 KVA, 16.7 amps.

10. Phase Monitor Relay, 200-240 volt or 440-480 volt, as required; capable of detecting loss of a single phase, under-voltage, over voltage, and voltage unbalance.

11. Lightning surge arrestor.

12. Elapsed time meter for each pump.

13. Lag pump time delay relay.

14. Seal failure relay, Flygt, with pilot light.

15. Low level float circuit, with pilot light and pump shut-down.

16. Audible Alarm horn, 93 dB at 20 feet.

17. Alarm beacon with flasher.

18. Alarm memory circuit to maintain alarm beacon until manually reset.

19. Additional isolated dry contacts.

    a. High level - contact type form "C".

    b. Low level - contact type form "C".

    c. Pump running (2) - contact type normally open.

    d. Pump off (2) - contact type normally closed.

    e. Motor over-temperature (2) - contact type form "C".

    f. Motor overload trip (2) - contact type normally open.

    g. Seal failure (2) - contact type form "C".

    h. Power failure - contact type form "C".

20. Float status pilot lights.

21. Float test switches.

22. Main breaker.

23. Operating voltage sign and station name.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install pumps equipment in accordance with manufacturer's recommendations.

B. Install pumps level, plumb, accurately aligned, with leak-proof pump connection, and easily removed without entering wet well.

C. Do not install J-box for motors and floats in pit. Run wires directly to control panel.

D. Install all electrical equipment outside of lift station pit.

E. Make no splices in cable.

F. Furnish and install all power connections to and from the control box in accordance with provisions of Division 16.

3.2 FLOATS

A. Suspend on brackets as shown on Drawings.

B. Make no splices in cables.

C. Adjust float levels as directed by LANL.

3.3 MANUFACTURER'S ON-SITE SERVICE

A. Arrange for a factory trained service engineer to be present to check installation and operation.

B. Arrange for a factory trained service engineer to provide a minimum of 4 hours per pump station of training to operating personnel on operation and maintenance of pumping equipment.

C. Provide a report by the service engineer certifying that equipment has been installed and is operating correctly.

3.4 EQUIPMENT SCHEDULE

A. Flygt Model [ ] with Model [ ] Impeller

1. GPM/TDH (ft): [ ]
2. HP: [ ]
3. Discharge (in): [ ]
4. RPM: [ ]
5. Volts/Phase: [ ]
6. Max motor Input at design point (KW):[ ]

B. Site elevation: 7500 feet

END OF SECTION